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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/658,407	09/10/2003	Tomohiro Ishikawa	402773	2243

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EXAMINER	
GABOR, OTILIA	
ART UNIT	**PAPER NUMBER**
2878	

DATE MAILED: 04/22/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/658,407	ISHIKAWA ET AL.	
	Examiner	Art Unit	
	Otilia Gabor	2878	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *10 September 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-14* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-14* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *10 September 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *09/10/2003*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1-5, 7, 8, 10-13 are rejected under 35 U.S.C. 102(e) as being clearly anticipated by Kimata (U. S. Patent 6,465,784).

Kimata discloses a thermal infrared detector and method of making, the detector comprising: a substrate (1); a temperature sensor (301) having electrical characteristics that change in response to a temperature change caused by absorption of IR rays; a heat-insulating supporting legs (21, 22) supporting and thermally insulating the temperature sensor (301) and including signal lines (31) for reading out electrical signals from the temperature sensor (301); and an infrared absorption layer (400) in thermal contact (140) with the temperature sensor (301), wherein the temperature sensor (301), the heat-insulating legs (21, 22) and the absorption layer (400) are in respective different planes where the planes are spatially separated from each other (see Fig.10, Col.6, line 50-Col.7, line 26, Col.16).

Regarding claims 10, 11 the method of making the detector of Kimata includes the steps of: forming a temperature sensor (301) on a substrate (1); forming a first

sacrificial layer (120) covering the temperature sensor (301) and contacting the substrate (1) (see Fig.5a); removing a portion of the sacrificial layer (120) to expose a portion of the temperature sensor (301) (see Figs.5a-5d, 10); forming a wiring layer (31, 32) on the first sacrificial layer (120), the wiring layer being electrically connected to the temperature sensor at a portion not covered by the sacrificial layer (see Fig.10); forming a second sacrificial layer (180) covering the wiring layer and contacting part of the first sacrificial layer (120); forming via holes by removing a part of the first and second sacrificial layers; forming an infrared absorbing layer (400) on the second sacrificial layer (180) so that the infrared absorbing layer (400) contacts the temperature sensor (301) through the via holes with an insulating layer (140) interposed; removing the first and second sacrificial layers and a portion (200) of the substrate (1) opposite the temperature sensor (301). This portion (200) of the substrate constitutes another, third sacrificial (could be called first) layer. See Figs. 5a-5d, 10, and Col.9, line 53-Col.16, line 60.

Regarding claims 2, 3, 4 the temperature sensor and the infrared absorption layer overlap and cover the insulating supporting legs and are laminated sequentially when viewed along the incident IR rays (see Figs.2, 10) since the absorption layer 400 extends substantially over the same length as the supporting legs and are positioned in different spatial planes.

Regarding claim 5 Kimata discloses that the temperature sensor (301) comprises a plurality of diodes (1a-1c, 2a-2c) serially connected (see Figs.1, 10, Col.6, lines 61-66).

Regarding claim 7 Kimata discloses (see Col.6, lines 57-65) that the substrate (1) includes a mono-crystalline silicon layer on an insulating film (SOI) where the temperature sensor (301) is formed in this layer.

Regarding claim 8 Kimata discloses that the substrate opposite the temperature sensor (301) is thinner than elsewhere (this portion is etched away thus making it thinner than anywhere else, see Figs.1, 10).

Regarding claims 12, 13 Kimata discloses that his thermal detector can be used as an array where a plurality of infrared detectors are positioned in a two-dimensional array (see Fig.3), and a forward bias voltage is applied so a constant current flows and the end-to-end voltage that is generated by incident IR rays in each of the plurality of IR detectors is read-out as an image signal (see Col.6, line 50-Col.9, line 52).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was

not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

5. Claims 6, 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kimata and further in view of Ishikawa et al. (U. S. Patent 6,483,111).

Kimata fails to disclose that the temperature sensor is a transistor and that it contains a bolometer film. However, since Kimata discloses a thermal sensor that changes its electrical characteristics in response to a temperature change, which is what a bolometer does, and since Kimata discloses a thermal infrared detector that is an improvement over the conventionally used bolometer detectors, and since transistors as well as diodes are conventionally used as thermal detectors it would have been obvious to one having ordinary skill in the art at the time the invention was made to substitute the temperature sensors using diodes of Kimata with the bolometer of Ishikawa that uses transistors, for as disclosed by Ishikawa, such substitution is done conventionally in the thermal infrared detection field.

6. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kimata and further in view of Gooch et al. (U. S. Patent 6,690,014).

Kimata fails to disclose the presence of a reference temperature sensor, however, it would have been obvious to one having ordinary skill in the art at the time the invention was made to include the reference temperature sensor of Gooch et al. (see Col.7, line 65-Col.8, line 10) into the detector array of Kimata since, as shown by Gooch et al., reference temperature sensors which are sensors that have the same

characteristics as the detection sensors but are insensitive to infrared radiation (are shielded from radiation) are efficiently utilized in order to provide an ambient temperature reference. Having such a reference temperature allows for a more accurate detection.

Conclusion

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure: Bluzer (6,489,615); Iida et al. (US 2002/0039838 A1); Ray (US 2002/0179837 A1); Reed et al. (US 2003/0141453 A1).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Otilia Gabor whose telephone number is 571-272-2435. The examiner can normally be reached on Monday, Thursday-Friday between 9am-5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Porta can be reached on 571-272-2444. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Otilia Gabor
Examiner
Art Unit 2878